LANL Workshop on
Closing the Gap between Infrastructure Assessments and Climate Simulation
7 January 2016

Sponsors: **ADCLES, ADTIR, ADTSC**

When: **Thursday, 7 January 2016; 10:30 am to 5:00 pm**

Where: **Piñon Conference Room (TA-53; Building 31; Room 201) — primary venue**
Cactus Conference Room (TA-53; Building 31; Room 305) — breakouts
Aspen Conference Room (TA-53; Building 31; Room 290) — breakouts

Purpose: **To develop a compelling technical understanding for needs at the interface between infrastructure assessment and climate simulation. The results of the workshop will inform a LANL strategy for capability enhancement, partner identification, and program development.**

10:30   *Welcome from ADs*

10:40   *Overview* (Guthrie & Backhaus)

- Goals of the workshop; introduction to climate impacts to infrastructure and how climate information is used in assessments; what could be gained by coupling the two more closely?

11:00   *Panel Discussion of Relevant Core LANL Capabilities*—short statement from each division representative followed by panel discussion/Q&A; introductory statements should summarize division's core (mission-related) capabilities relevant to addressing issues at the interface between climate and infrastructure.

11:30   *Panel Discussion of Sponsor Perspectives*—short statement from each program representative followed by panel discussion/Q&A; introductory statements should address sponsor missions, brief description of current portfolio, projection of sponsor needs/priorities in the 2–5 year window relative to climate–infrastructure impacts; and any program development activities or opportunities that exist that target these priorities

12:00   Working Lunch: Other Initiatives Related to Climate–Infrastructure
   o   Coastal zone systems—Cathy Wilson
   o   Energy-water nexus; disturbance—Richard Middleton

1:00   *Overview of Needs and LANL Capabilities by Topic*
   o   Infrastructure assessment—Donatella Pasqualini
   o   Climate prediction—Todd Ringler
   o   Uncertainty quantification—Nathan Urban

2:00   *Breakout Session 1: Defining the Technical Story*. Facilitated breakout discussions to develop report-out at workshop end. Focus on: What is an innovative and compelling approach? What would be the outcome/product? What would it enable that is not achievable now?

3:15   *Breakout Session 2: Assessing the Landscape*. Facilitated breakout discussions to develop report-out at workshop end. Focus on: What is the LANL niche? Who are key competitors and/or potential collaborators? Who are potential sponsors and what are anticipated PD challenges?

4:00   *Next Steps*. Report-out to leadership from divisions and program offices. Facilitated discussion with division leadership (A, CCS, EES, ISR, T). How do LANL capabilities What can be done to facilitate development of a larger initiative in this area? What has hindered previous PD efforts?

4:45   Closing from TOC—Summary of day and next steps

Central Themes behind the Workshop:

- Weather impacts to the infrastructure, particularly the energy infrastructure, are central to public and private planning efforts, both in the near-term (e.g., preparing for event response) and in the long-term (e.g., in planning for infrastructure investments for resilience, adaptation, and efficiency).

- Climate change is anticipated to affect relevant weather patterns at a time scale such that using historical trends to predict future conditions introduces uncertainties that may impact both near-term planning and long-term planning. These climate-related impacts could range from changes in geospatial distributions of temperature and water availability to changes in the nature of extreme events.

- Climate model predictions could be used to inform assessment of infrastructure impacts in the context of planning, but the outputs from such predictions are not currently amenable to serve as inputs into impact assessments.

- Opportunities could exist for DOE and LANL to bridge the gap between climate predictions and infrastructure assessments. This document assesses those opportunities and proposes a strategy for LANL to pursue in developing those opportunities.

- The origin of this gap is both technical and programmatic. From a technical side, the level of detail for climate predictions is typically at a scale significantly different from the level needed for impact assessments, and this difference is reflected in distinct perspectives in the respective technical communities. From the programmatic side, each sponsor is typically concerned with only a piece of the overall infrastructure, so system interconnectivities fall outside of any one sponsor's space (or cross-cuts many sponsors).

- Two grand challenges exist for predictions of the natural system as needed to assess potential impacts to the energy infrastructure:

  - *Improving the accuracy of longer-term predictions in the month to year timeframe to facilitate preparedness for extreme events.* In the near term, changes in the frequency, intensity, and distribution of extreme events limit the relevance of historical distributions in planning for response to extreme events, yet current approaches to weather forecasting lose accuracy beyond roughly 10 days (significantly limiting the timeframe for preparedness).

  - *Improving stochastic climate–infrastructure assessments through strategic coupling with high fidelity national- and regional-scale climate predictions in the decade to century timeframe.* Planning for infrastructure necessarily focuses on a multi-decade window, due both to the time required to adapt infrastructure and to the long service life required to amortize large investments. (Relevant climate-related factors include, for example, averages and extremes in temperature/precipitation/etc. as well as frequency/intensity/distribution of extreme events.) Strategic planning, hence, requires predicting the evolution of geospatial energy demands and infrastructure vulnerabilities in the 10–100 year time frame.

List of Participants (confirmed)

A-DO:	Joysree Aubrey
A-1:	John Ambrosiano, James Arnold, Scott Backhaus, Russell Bent, David Cremer, Steve Linger, Donatella Pasqualini, Amanda Robertson, Byron Tasseff
A-2:	Jake Turin
CCS-DO:	Stephen Lee, Frank Alexander
CCS-2:	Nathan Urban, Alex Jonko
CCS-3:	Stephan Eidenbenz, Patrick Kelly, Amy Larson, Loren Toole
CCS-6:	Jim Gattiker
EED-DO:	Jim Bossert, Claudia Mora, George Guthrie
EES-14:	Manvendra Dubey, Joel Rowland, Cathy Wilson, Nate McDowell
EES-16:	Ethan Coon, Richard Middleton
FCI:	Don Hickmott
GS-ET:	Jon Schoonover
IGPPS:	Reiner Friedel
LDRD:	Bill Priedhorsky
SPO-AE:	Melissa Fox
SPO-SC:	Don Rej
T-DO:	Jack Shlachter, Neil Henson
T-1:	Joel Kress
T-3:	Phil Jones, Steve Price, Todd Ringler, Juan Saenz, Phillip Wolfram
T-4:	Misha Chertkov
T-5:	David Moulton, Aric Hagberg
T-6:	Nick Hengartner
ESC:	David Morris
ADCLES:	Nan Sauer
ADTIR:	NJ Nicholas
ADTSC:	John Sarrao, Paul Dotson
PADSTE:	Carol Burns